


05 - GROUNDING & BONDING
INDEX OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
IND-01	GROUNDING & BONDING INDEX OF DRAWINGS		
BBG-01	GROUNDING & BONDING GENERAL NOTES, LEGEND, AND ABBREVIATIONS		
BBG-02	GROUNDING & BONDING ROUTE 349 SOUTHBOUND BRIDGE NO. 03330		
BBG-03	GROUNDING & BONDING ROUTE 349 NORTHBOUND BRIDGE NO. 03331		
BBG-04	GROUNDING & BONDING STAGING PLANS SHEET 1 OF 2		
BBG-05	GROUNDING & BONDING STAGING PLANS SHEET 2 OF 2		
BBG-06	GROUNDING & BONDING ASSEMBLY DETAILS SHEET 1 OF 2		
BBG-07	GROUNDING & BONDING ASSEMBLY DETAILS SHEET 2 OF 2		
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DESIGNED BY:
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TRANSIT & RAIL SYSTEMS
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SUITE 17
ROCKY HILL, CT 06067

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				<div>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.</div>	DESIGNER/DRAFTER: AJM	<div> STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</div>	<div>SIGNATURE/ BLOCK: GANNETT FLEMING</div>	PROJECT TITLE: RECONSTRUCTION OF ROUTE 349 NB AND SB OVER AMTRAK RAILROAD	TOWN: GROTON	PROJECT NO. 058-332
			CHECKED BY: WJS/WWF		DRAWING TITLE: GROUNDING & BONDING INDEX OF DRAWINGS				DRAWING NO. IND-01	
			SCALE AS NOTED						SHEET NO.	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.		Plotted Date: 3/1/2016				Filename: ...\\058-332_Drawing_Index.dgn	

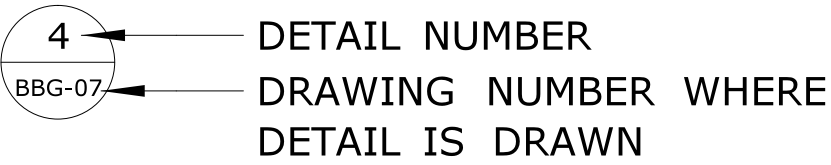
GENERAL NOTES:

1. GROUNDING AND BONDING WORK WILL BE PAID UNDER ITEM #1015034A - GROUNDING AND BONDING. ALL GROUNDING AND BONDING WORK SHOWN WILL BE DONE BY THE CONTRACTOR, EXCEPT FOR THE CONNECTIONS OF THE NEW BONDING LOOP TO THE EXISTING RAILROAD STATIC WIRE. THOSE CONNECTIONS WILL BE DONE BY AMTRAK.
2. THE GROUNDING AND BONDING STAGING PLANS SHOW THE SUGGESTED SEQUENCING OF THE GROUNDING AND BONDING WORK AND ARE NOT NECESSARILY TO BE USED AS THE CONSTRUCTION SEQUENCING AND STAGING PLANS FOR THE BRIDGE REPLACEMENT WORK. THE BRIDGE CONSTRUCTION SEQUENCING AND STAGING PLANS ARE SHOWN ELSEWHERE IN THE PLANS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL ACCOMPLISH ALL NECESSARY COORDINATION WITH OTHER RELATED CONSTRUCTION PHASES AND CONTRACTORS FOR THIS PROJECT, INCLUDING AMTRAK FORCE ACCOUNT PERSONNEL.
4. BEFORE ANY WORK IS COMMENCED, THE CONTRACTOR IS TO COORDINATE WITH AMTRAK REGARDING REQUIREMENTS OF TRACK AND/OR POWER OUTAGES FOLLOWING ALL STANDARD PROCEDURES AND SAFETY RULES.
5. WORK SEQUENCES SHOWN IN GROUNDING AND BONDING STAGING PLANS IS SIMILAR FOR BOTH BRIDGES BEING REPLACED.
6. ALL CONTRACTOR PERSONNEL ARE REQUIRED TO PARTICIPATE IN THE RAILROAD'S SAFETY CONTRACTOR/LEASEE EMPLOYEE TRAINING CLASS PRIOR TO ENTERING AMTRAK PROPERTY.
7. WORK WILL REQUIRE USE OF ON-TRACK HIGH RAIL BUCKET TRUCKS AND EQUIPMENT FOR THE INSTALLATION AND CONNECTION OF NEW BONDING WIRES AND PLATES, AND FOR THE REMOVAL AND DISCONNECTION OF EXISTING BONDING WIRES AND PLATES.
8. ALL CONTRACTOR ON-TRACK HIGH RAIL EQUIPMENT IS TO BE INSPECTED AND APPROVED BY AMTRAK AT THEIR MAINTENANCE-OF-WAY FACILITY LOCATED IN NEW HAVEN, CT. THESE INSPECTIONS ARE TO BE MADE PRIOR TO USE OF THIS EQUIPMENT ON AMTRAK PROPERTY.
9. FOR THE REMOVAL OF THE EXISTING SUPERSTRUCTURE, INSTALLATION OF THE NEW DECK UNITS, REMOVAL AND INSTALLATION OF TEMPORARY FORMS, AND THE INSTALLATION OF METAL BRIDGE RAIL (SOLID PANEL), THE CATENARY AND FEEDER WIRES FOR BOTH TRACKS 1 AND 2 SHALL BE DE-ENERGIZED.
10. THE TIMES AND DURATIONS OF ALLOWED DE-ENERGIZING OF THE CATENARY AND FEEDER WIRES FOR TRACKS 1 AND 2 ARE SHOWN IN OTHER SECTIONS OF THE PLANS AND SPECIFICATIONS.
11. THE CONTRACTOR'S ON-TRACK HIGH RAIL EQUIPMENT WILL ONLY BE ALLOWED TO OCCUPY TRACK 1 OR 2 DURING ANY SCHEDULED TRACK AND CATENARY/FEEDER OUTAGE.
12. THE LOCATION FOR SETTING THE CONTRACTOR'S ON-TRACK HIGH RAIL EQUIPMENT ON THE TRACKS IS AT THE GOVERNOR WINTHROP BOULEVARD ROAD CROSSING IN NEW LONDON, CT NEAR MP 123.0, APPROXIMATELY 2 MILES FROM THE WORK SITE.
13. TRAVEL TIME FROM THE ON-TRACK HIGH RAIL ACCESS LOCATION TO THE WORK SITE, AND FOR RETURNING FROM THE WORK SITE TO THE ACCESS LOCATION, IS TO BE PART OF THE WORK PLAN FOR ANY WORK REQUIRING THE USE OF ON-TRACK HIGH RAIL EQUIPMENT.
14. ONLY ONE TRACK (TRACK 1 OR 2) WILL BE ALLOWED TO BE OCCUPIED BY THE CONTRACTOR'S ON-TRACK HIGH RAIL EQUIPMENT AT A TIME. DURING THE REMOVAL OF THE EXISTING BRIDGE BEAMS AND INSTALLATION OF NEW DECK UNITS, THE WORK MAY REQUIRE REMOVAL/INSTALLATION OF BONDING WIRES AND PLATES OVER BOTH TRACKS. THE CONTRACTOR'S ON-TRACK HIGH RAIL EQUIPMENT IS TO BE CAPABLE OF REACHING THE WORK AREAS OVER BOTH TRACKS 1 AND 2 WHILE SETTING ON ONLY ONE OF THE TRACKS.
15. DURING THE INSTALLATION OF THE TEMPORARY AND THE NEW METAL BRIDGE RAIL (SOLID PANEL), THE PANEL POSTS ARE TO BE BONDED TO EACH OTHER AND TO THE NEW AND/OR EXISTING BRIDGE BONDING SYSTEM AT ALL TIMES. THIS BONDING IS REQUIRED TO BE IN PLACE AT THE END OF EACH WORK SHIFT.
16. DURING THE REMOVAL OF THE EXISTING BRIDGE BEAMS, THE REMAINING IN-PLACE EXISTING BEAMS ON THE BRIDGE ARE TO BE BONDED TO THE NEW AND/OR EXISTING BRIDGE BONDING SYSTEM AT ALL TIMES. THIS BONDING IS REQUIRED TO BE IN PLACE AT THE END OF EACH WORK SHIFT.
17. DURING THE INSTALLATION OF THE NEW BRIDGE DECK UNITS, THE NEW BEAMS ARE TO BE BONDED TO THE NEW AND/OR EXISTING BRIDGE BONDING SYSTEM AT ALL TIMES. THIS BONDING IS REQUIRED TO BE IN PLACE AT THE END OF EACH WORK SHIFT.
18. AFTER INSTALLATION OF ALL NEW BRIDGE DECK UNITS AND THE ALUMINUM GROUNDING AND BONDING PLATES, THE CONTRACTOR SHALL MAKE A FINAL VISUAL INSPECTION OF THE LOCATION OF THE PLATES. DUE TO ANY TRACK MAINTENANCE THAT MAY HAVE BEEN DONE UNDER THE BRIDGES BY AMTRAK SINCE THE PROJECT WAS DESIGNED, THE LOCATION OF THE ALUMINUM GROUNDING AND BONDING PLATES MAY HAVE TO BE ADJUSTED. IF REQUIRED, THE CONTRACTOR SHALL FINAL ADJUST THE ATTACHMENT LOCATIONS OF THE PLATES SO THAT THE CENTER OF THE PLATES ARE ALIGNED DIRECTLY OVER THE CATENARY WIRES. THIS WORK, IF REQUIRED, SHALL BE PAID AS INCIDENTAL TO THE INSTALLATION OF THE GROUNDING AND BONDING SYSTEM.



ABBREVIATIONS:

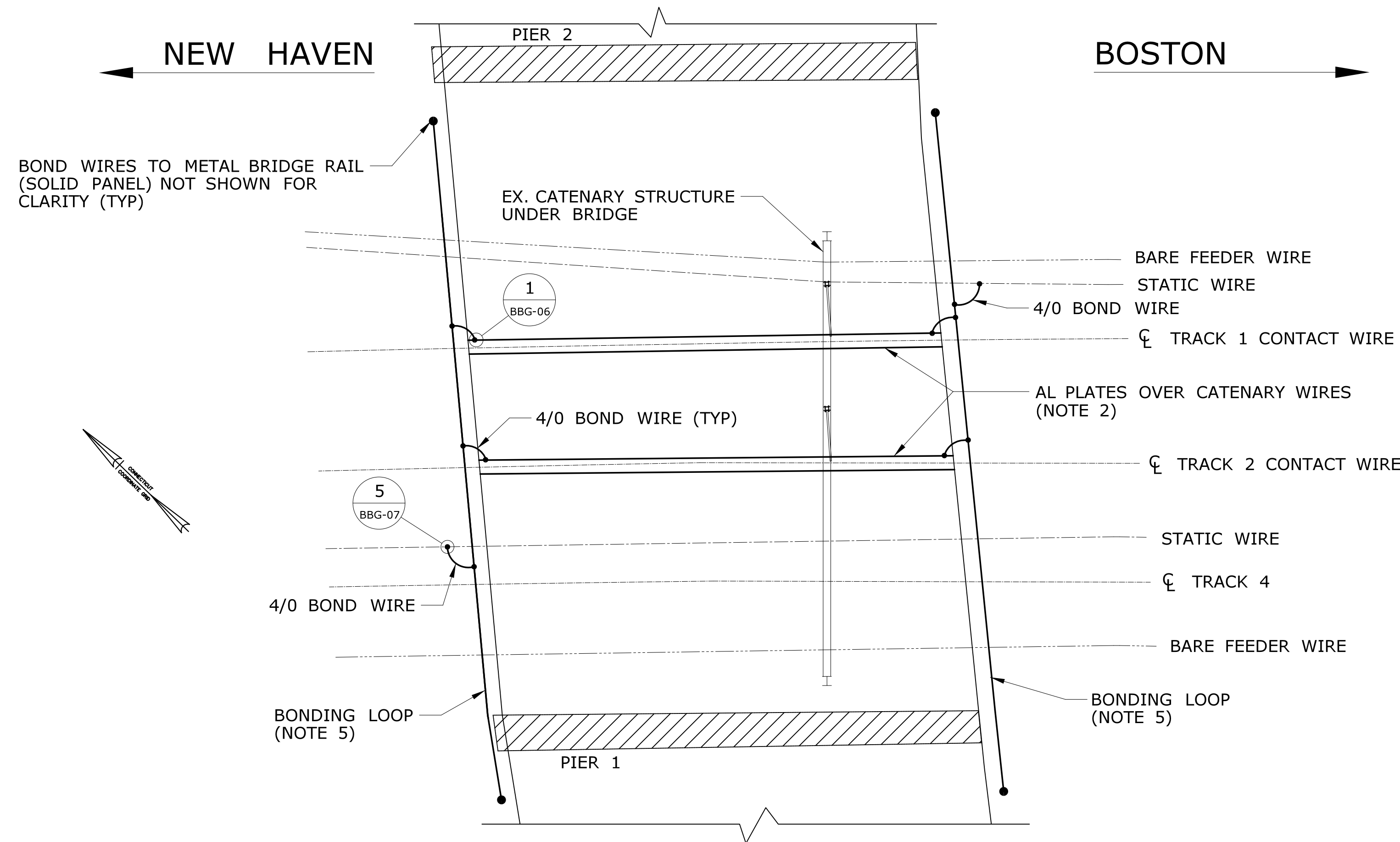
- ACSR - ALUMINUM CONDUCTOR STEEL REINFORCED
- AL - ALUMINUM
- AWG - AMERICAN WIRE GAUGE
- CL - CENTER LINE
- DIA - DIAMETER
- DWG - DRAWING
- EA - EACH
- EX. - EXISTING
- FDR - RAILROAD FEEDER
- MAX - MAXIMUM
- MIN - MINIMUM
- NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- NOM. - NOMINAL
- NO. - NUMBER
- N.T.S. - NOT TO SCALE
- O.C. - ON CENTER
- OCS - OVERHEAD CATENARY SYSTEM
- S.S. - STAINLESS STEEL
- SW - RAILROAD STATIC WIRE
- T/R - TOP OF RAIL
- TPCBC - TEMPORARY PRECAST CONCRETE BARRIER CURB
- TYP - TYPICAL
- W/ - WITH

DETAIL CALLOUT

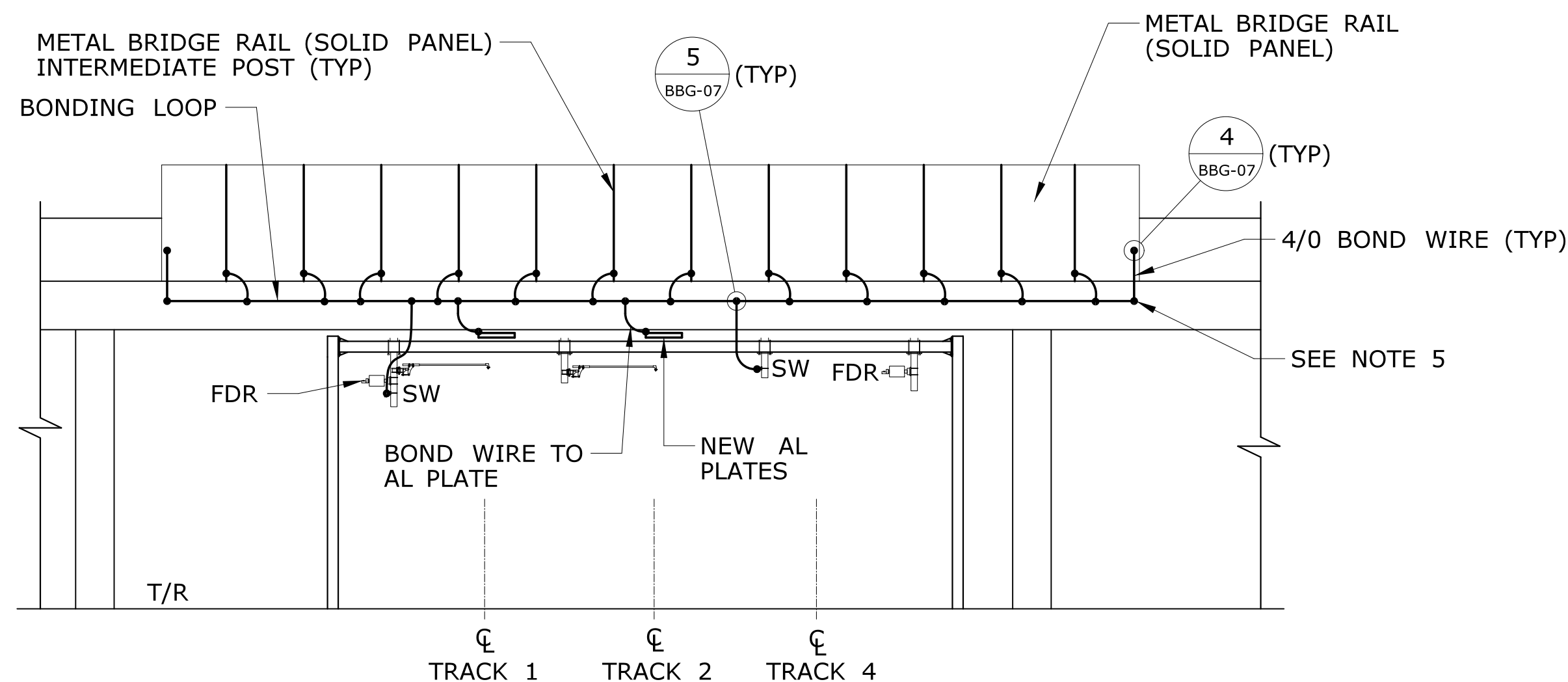


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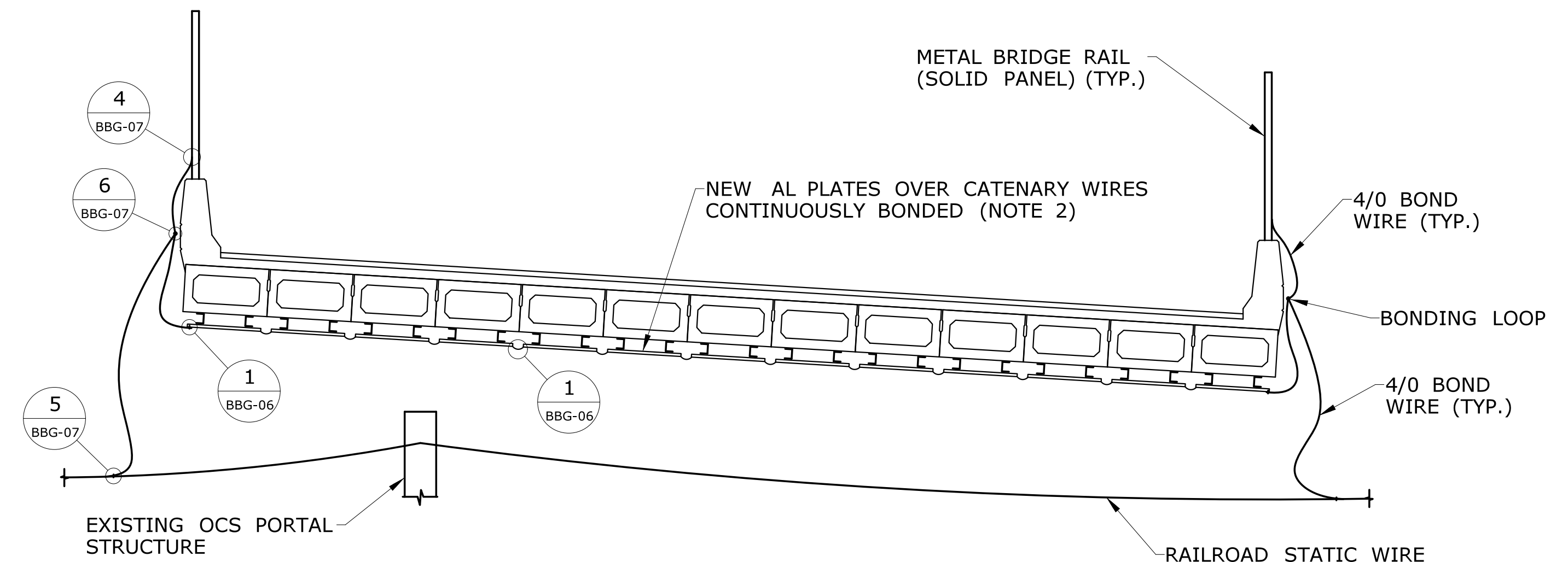
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						CHECKED BY: WJS/WWF									DRAWING TITLE: GROUNDING & BONDING GENERAL NOTES, LEGEND, AND ABBREVIATIONS		DRAWING NO. BBG-01	
						SCALE AS NOTED											SHEET NO.	
REV.	DATE	REVISION	DESCRIPTION	SHEET NO.	Plotted Date: 3/3/2016	Filename: ...\\058_332_G&B_gen_notes.legend_Sheet.dgn												



PROPOSED BRIDGE NO. 03330 PLAN VIEW
SCALE: N.T.S.



PROPOSED BRIDGE NO. 03330 ELEVATION VIEW
LOOKING TOWARDS BOSTON
SCALE: N.T.S.




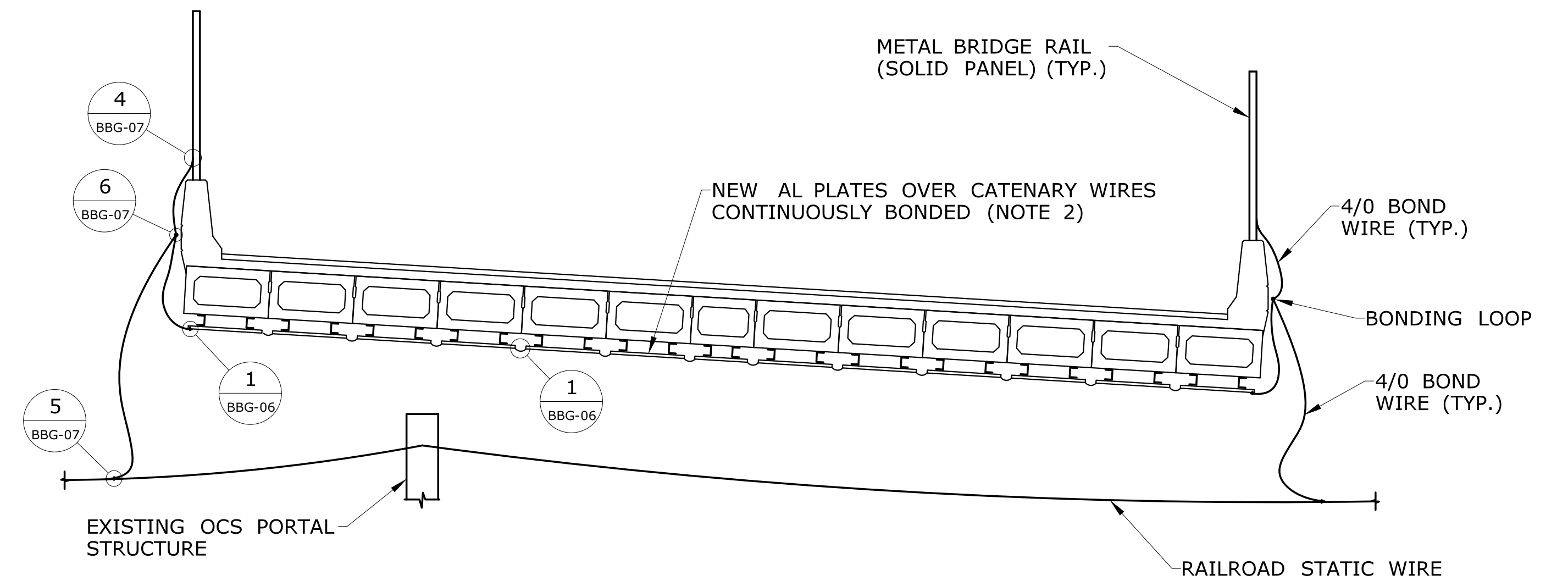
PROPOSED BRIDGE NO. 03330 SECTION VIEW
SCALE: N.T.S.


NOTES:

1. SOUTHBOUND BRIDGE SHOWN, APPROXIMATE RAILROAD STATION 124+5006.
2. SEE DWG NO. BBG-06 FOR ADDITIONAL DETAILS FOR THE ALUMINUM PLATES.
3. ALL BOND WIRE JUMPERS AND BONDING LOOPS ARE TO BE 4/0 ALUMINUM UNLESS OTHERWISE NOTED.
4. SEE THE STRUCTURAL SUBSET OF THIS PROJECT FOR ADDITIONAL DETAILS OF BRIDGE SUBSTRUCTURE, BRIDGE SUPERSTRUCTURE, METAL BRIDGE RAIL (SOLID PANEL), ETC.
5. THE BONDING LOOP IS TO BE ATTACHED TO THE BRIDGE PARAPET EVERY 3'-0" (NOM.) O.C. SEE DETAIL 6 ON DWG NO. BBG-07 FOR TYPICAL ATTACHMENT DETAIL.

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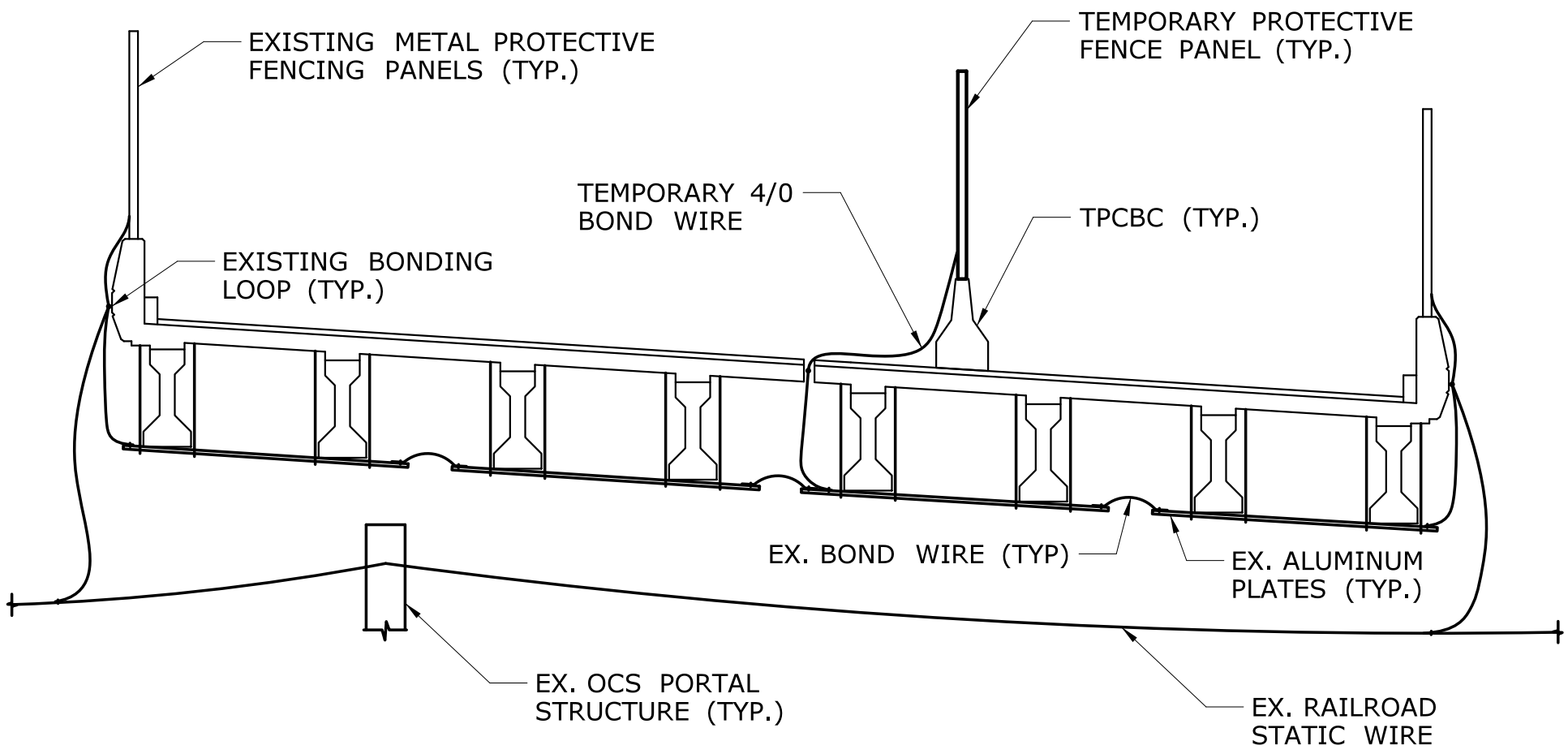
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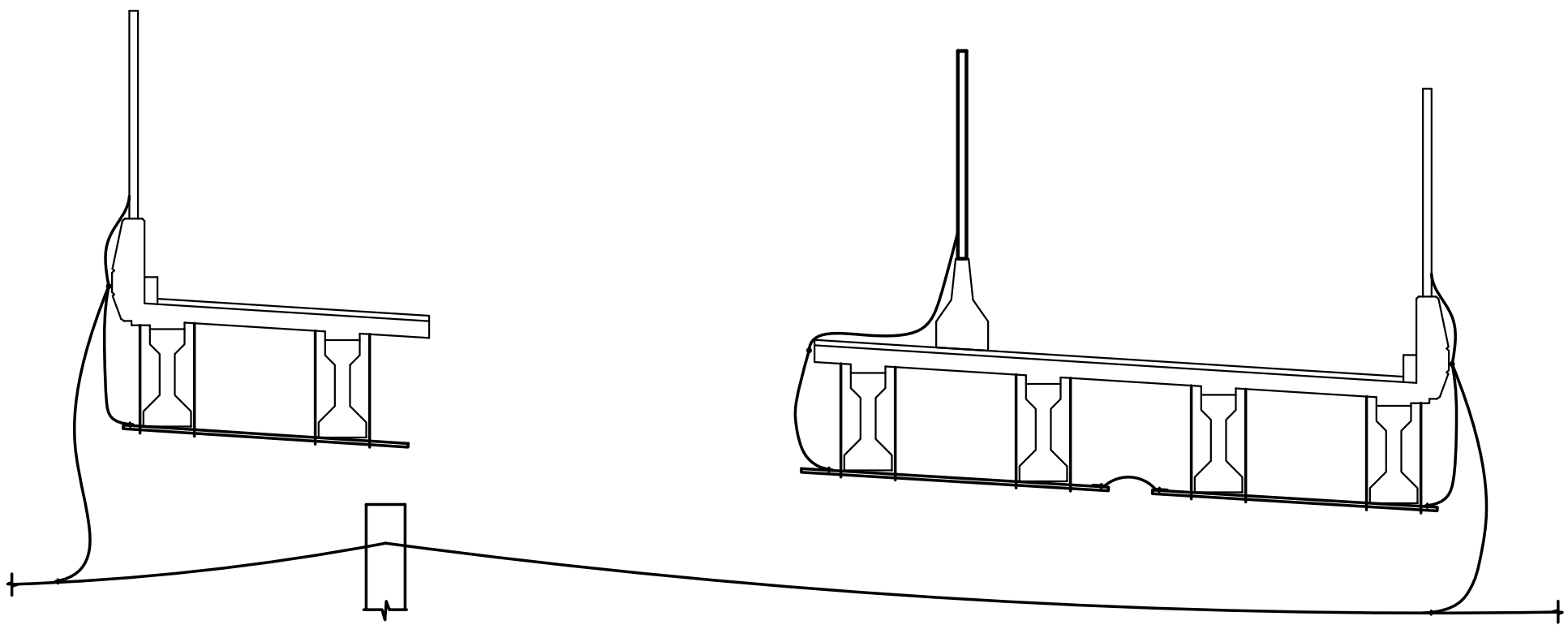
STAGE 1

- 1. THE WEST SIDE OF THE ROADWAY TAKEN OUT OF SERVICE.
- 2. INSTALL TEMPORARY PRECAST CONCRETE BARRIER CURBS WITH TEMPORARY PROTECTIVE FENCE PANELS.
- 3. BOND THE TEMPORARY PROTECTIVE FENCE PANEL POSTS TO EACH OTHER, AND TO THE EXISTING BRIDGE BONDING SYSTEM THAT IS ATTACHED TO THE BOTTOM OF THE EXISTING BEAMS.



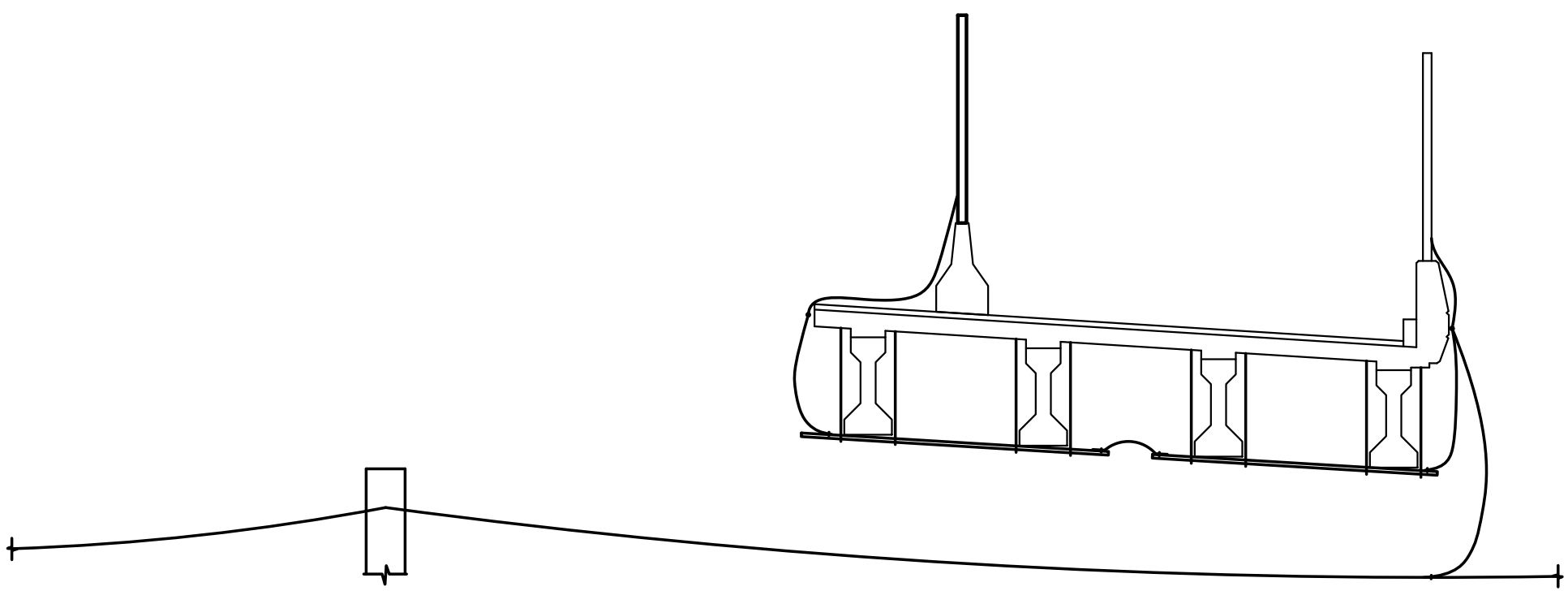
STAGE 2

- 1. REMOVE FIRST TWO EXISTING BEAMS, ONE AT A TIME.
- 2. DISCONNECT EXISTING ALUMINUM PLATE BOND WIRES BETWEEN BEAMS BEING REMOVED AND THE EXISTING BRIDGE BONDING SYSTEM.



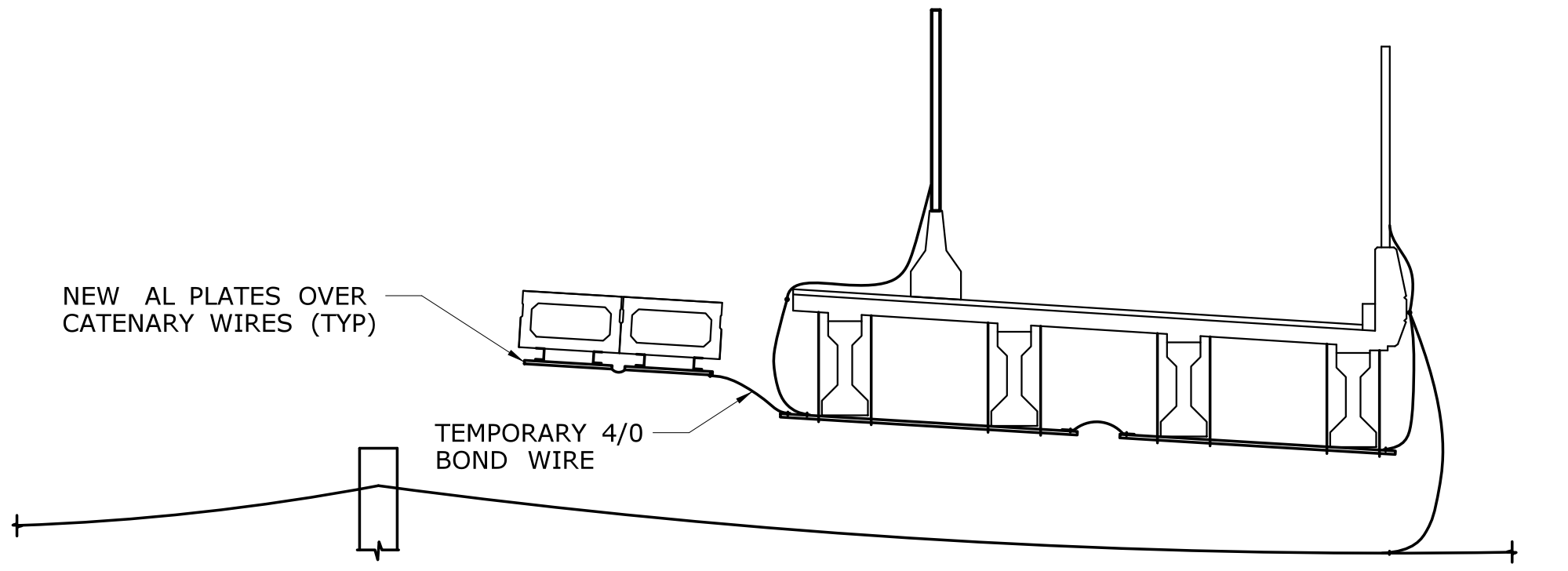
STAGE 3

- 1. REMOVE EXISTING METAL PROTECTIVE FENCING PANELS FROM TOP OF PARAPET. REMOVE EXISTING BONDING WIRES FROM METAL PROTECTIVE FENCING PANELS.
- 2. REMOVE EXISTING CONCRETE PARAPET.
- 3. REMOVE SECOND TWO EXISTING BEAMS, ONE AT A TIME.
- 4. DISCONNECT EXISTING BOND WIRES BETWEEN BEAMS BEING REMOVED, AND THE EXISTING RAILROAD STATIC WIRE.



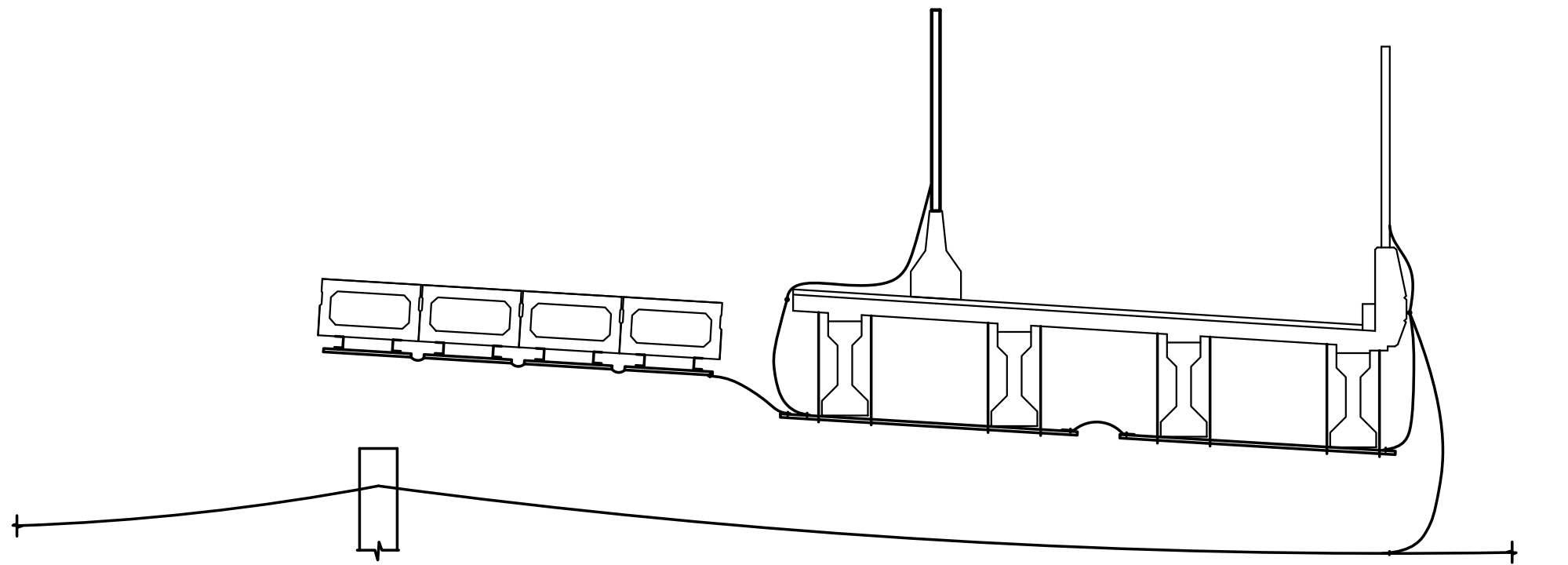
STAGE 4

- 1. INSTALL THE FIRST TWO NEW DECK UNITS, ONE AT A TIME.
- 2. CONNECT THE NEW ALUMINUM PLATES AND FLEXIBLE BOND WIRE JUMPERS TO EACH OTHER, AND TO THE EXISTING BRIDGE BONDING SYSTEM.



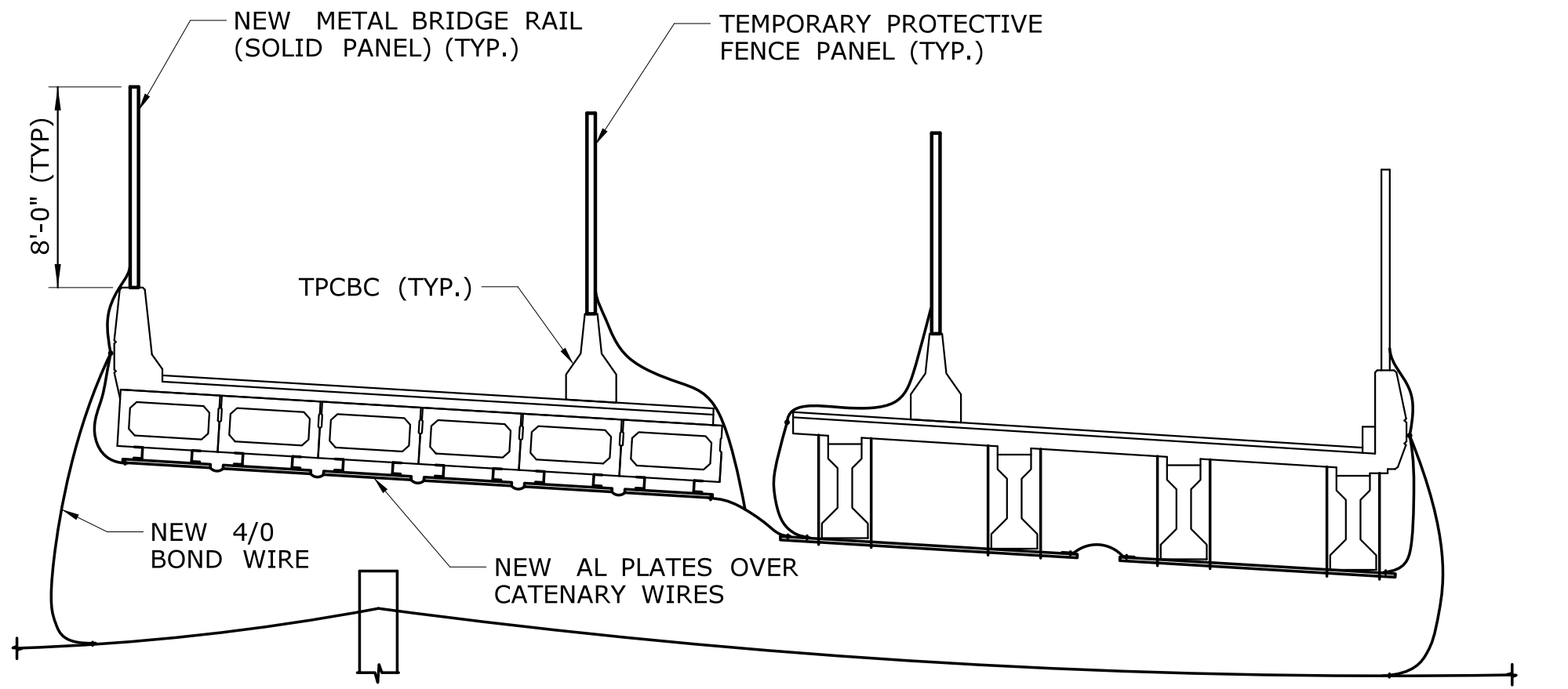
STAGE 5

- 1. INSTALL THE SECOND SET OF TWO NEW DECK UNITS, ONE AT A TIME.
- 2. CONNECT THE NEW ALUMINUM PLATES AND FLEXIBLE BOND WIRE JUMPERS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.





STAGE 6

- 1. INSTALL THE THIRD SET OF TWO NEW DECK UNITS, ONE AT A TIME.
- 2. CONNECT THE NEW ALUMINUM PLATES AND FLEXIBLE BOND WIRE JUMPERS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.
- 3. INSTALL NEW CONCRETE FASCIA PARAPET.
- 4. INSTALL NEW METAL BRIDGE RAIL (SOLID PANEL) ABOVE THE PARAPET. BOND THE NEW METAL BRIDGE RAIL (SOLID PANEL) POSTS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.
- 5. INSTALL NEW BOND WIRE BETWEEN THE EXISTING RAILROAD STATIC WIRE AND THE NEW BRIDGE BONDING SYSTEM.
- 6. INSTALL TEMPORARY PRECAST CONCRETE BARRIER CURBS WITH TEMPORARY PROTECTIVE FENCE PANELS.
- 7. BOND THE TEMPORARY PROTECTIVE FENCE PANEL POSTS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.

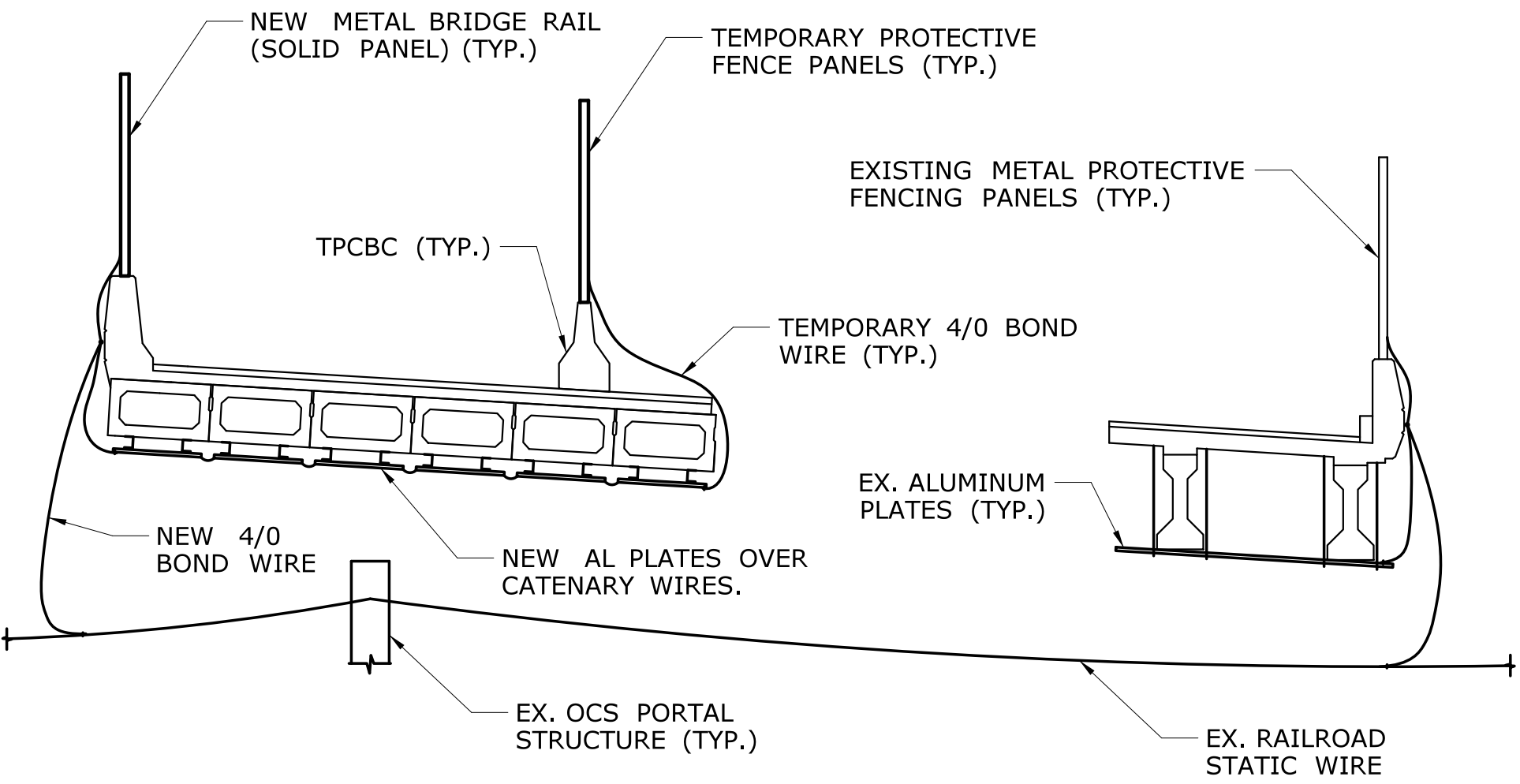


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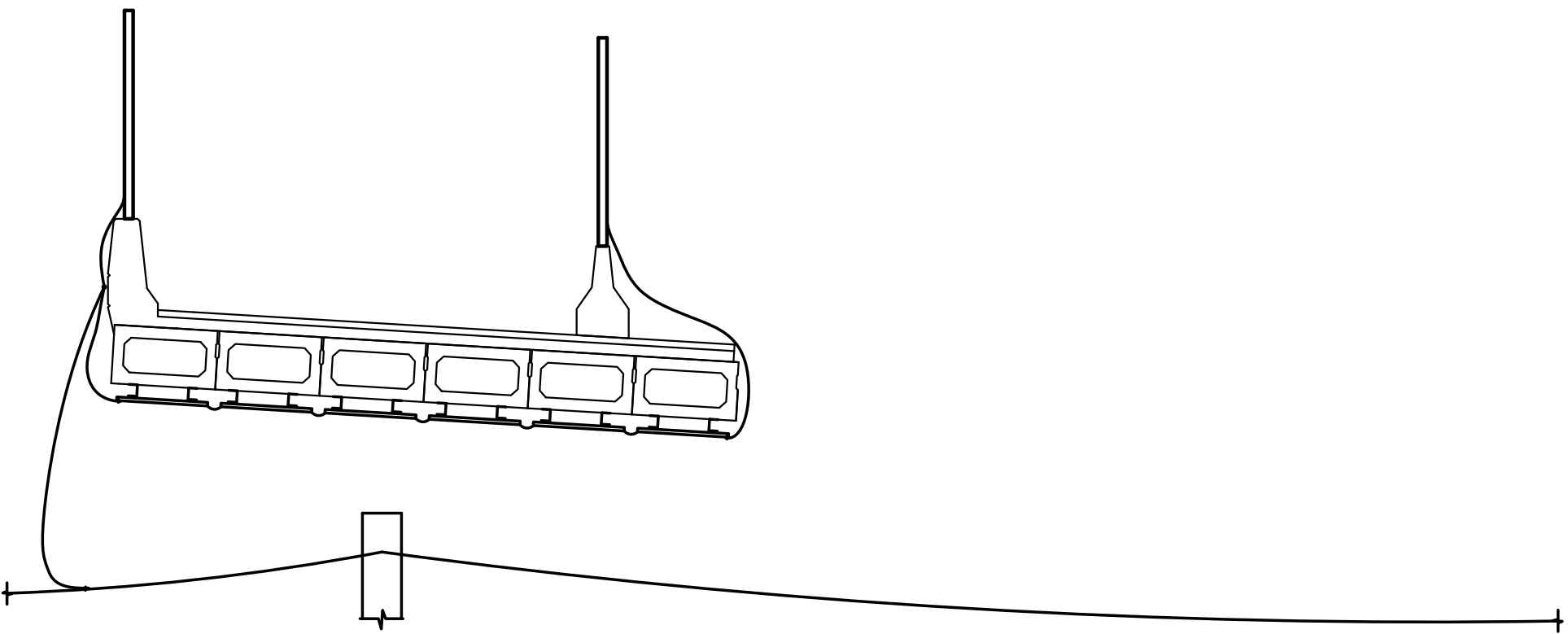
STAGE 7

1. THE WEST SIDE OF THE ROADWAY IS PUT INTO SERVICE.
2. THE EAST SIDE OF THE ROADWAY IS TAKEN OUT OF SERVICE
3. DISCONNECT THE BOND WIRE BETWEEN THE NEW AND EXISTING BRIDGE BONDING SYSTEMS.
4. REMOVE THE TEMPORARY PROTECTIVE FENCE PANELS ON THE EAST SIDE OF THE ROADWAY. REMOVE BONDING WIRES FROM THE TEMPORARY PROTECTIVE FENCE PANELS.
5. REMOVE THE TEMPORARY PRECAST CONCRETE BARRIER CURBS.
6. REMOVE TWO EXISTING BEAMS, ONE AT A TIME.
7. DISCONNECT EXISTING ALUMINUM PLATE BOND WIRES BETWEEN BEAMS BEING REMOVED AND THE EXISTING BRIDGE BONDING SYSTEM.



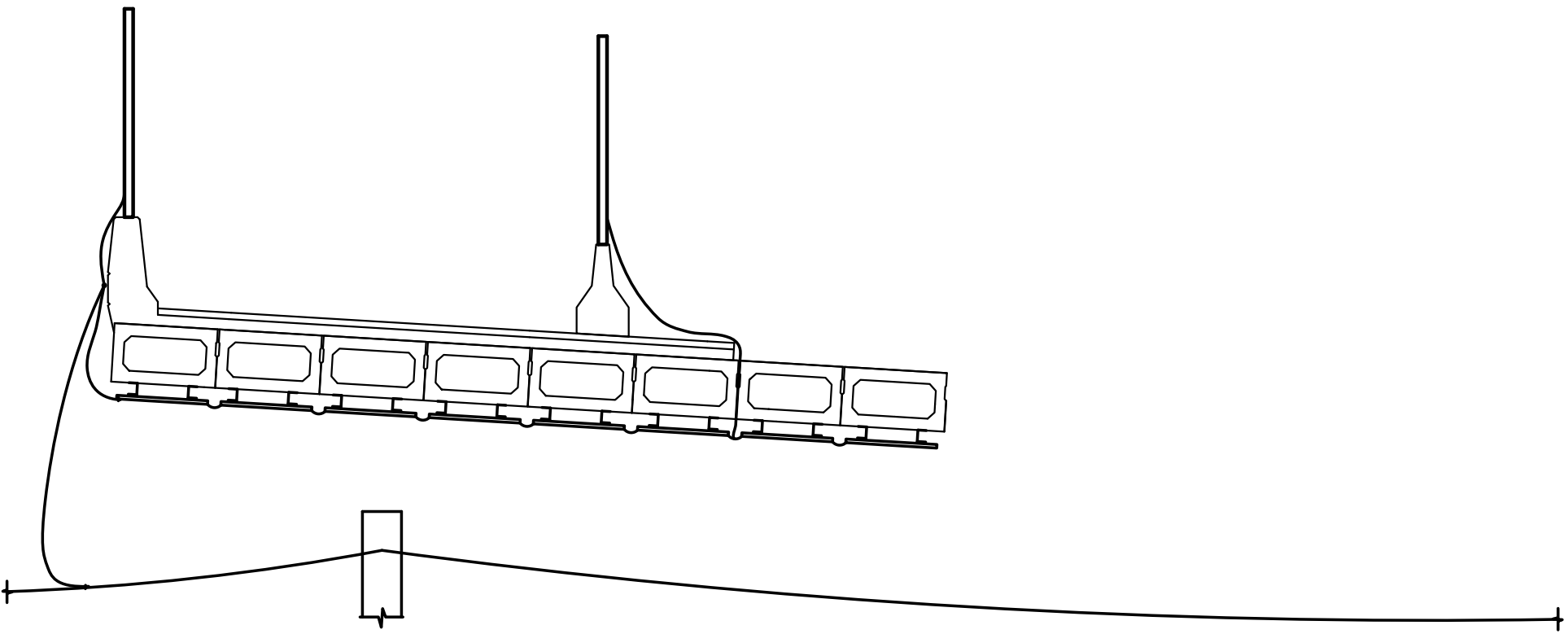
STAGE 8

1. REMOVE EXISTING METAL PROTECTIVE FENCING PANELS FROM TOP OF PARAPET. REMOVE EXISTING BONDING WIRES FROM METAL PROTECTIVE FENCING PANEL POSTS.
2. REMOVE EXISTING CONCRETE PARAPET.
3. REMOVE THE LAST TWO EXISTING BEAMS, ONE AT A TIME.
4. DISCONNECT EXISTING BOND WIRES BETWEEN BEAMS BEING REMOVED AND THE EXISTING RAILROAD STATIC WIRE.



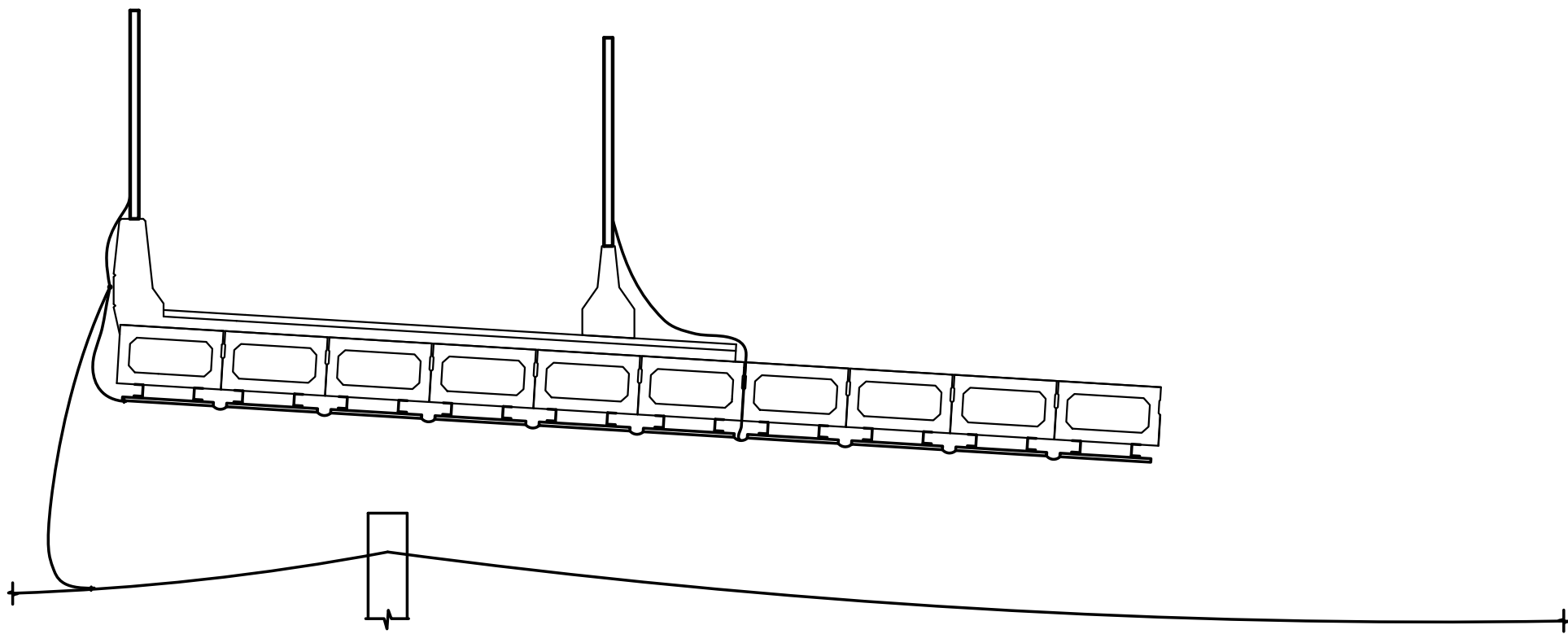
STAGE 9

1. INSTALL TWO NEW DECK UNITS, ONE AT A TIME.
2. CONNECT THE NEW ALUMINUM PLATES AND FLEXIBLE BOND WIRE JUMPERS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.



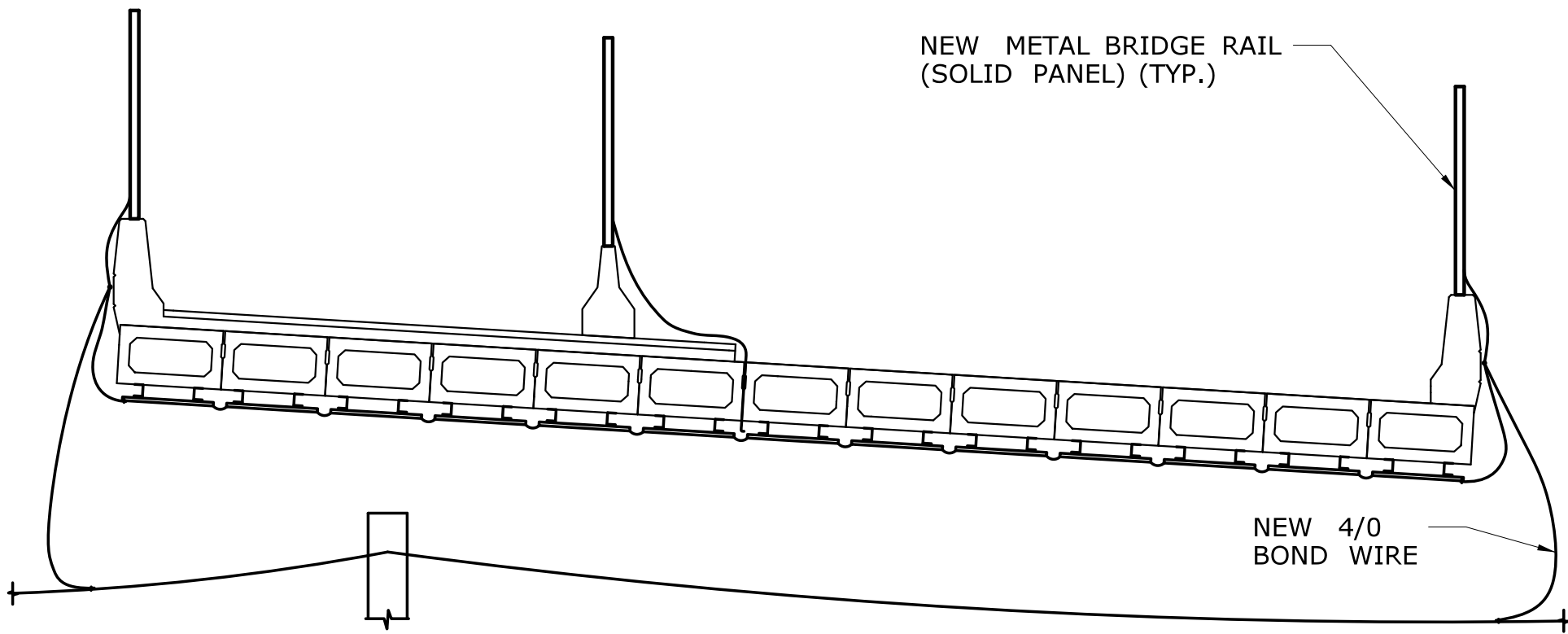
STAGE 10

1. INSTALL TWO NEW DECK UNITS, ONE AT A TIME.
2. CONNECT THE NEW ALUMINUM PLATES AND FLEXIBLE BOND WIRE JUMPERS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.



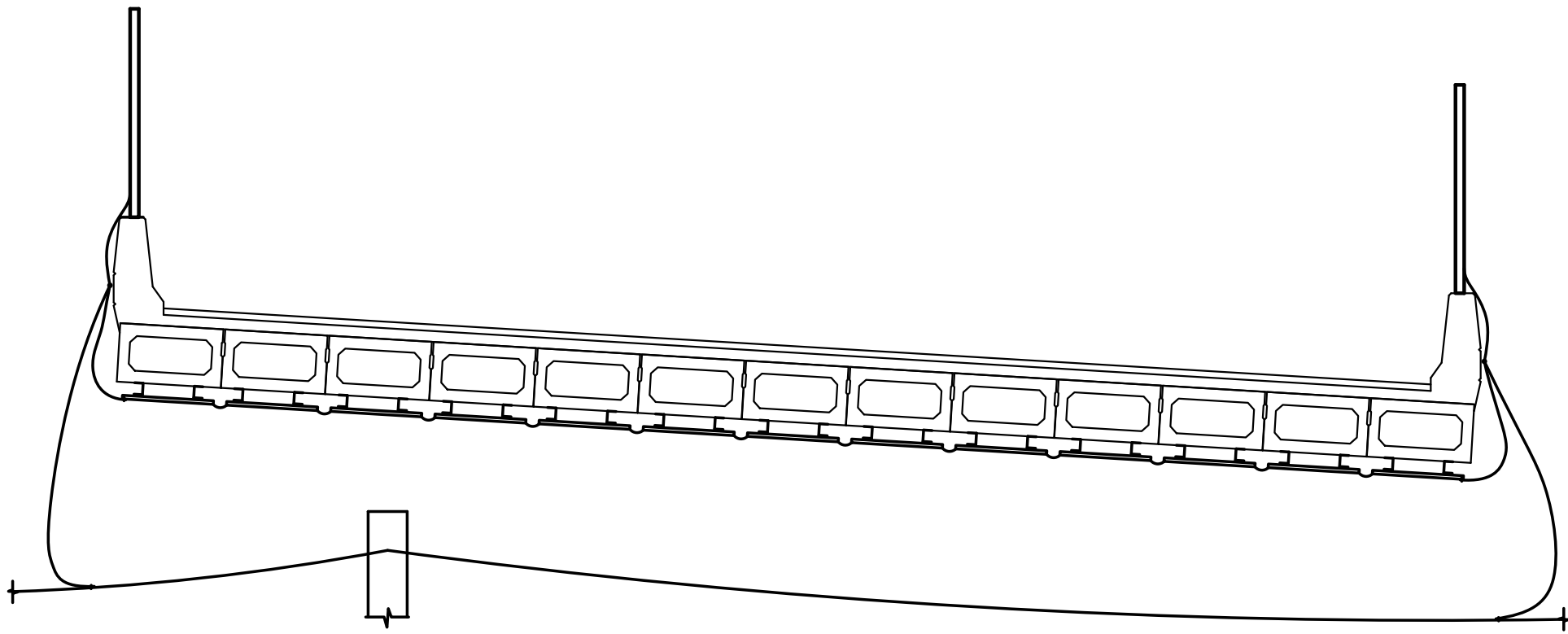
STAGE 11

1. INSTALL THE LAST THREE NEW DECK UNITS, ONE AT A TIME.
2. CONNECT THE NEW ALUMINUM PLATES AND FLEXIBLE BOND WIRE JUMPERS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.
3. INSTALL NEW CONCRETE FASCIA PARAPET.
4. INSTALL NEW METAL BRIDGE RAIL (SOLID PANEL) ABOVE THE PARAPET. BOND THE NEW METAL BRIDGE RAIL (SOLID PANEL) POSTS TO EACH OTHER, AND TO THE NEW BRIDGE BONDING SYSTEM.
5. INSTALL NEW BOND WIRE BETWEEN THE EXISTING RAILROAD STATIC WIRE AND THE NEW BRIDGE BONDING SYSTEM.




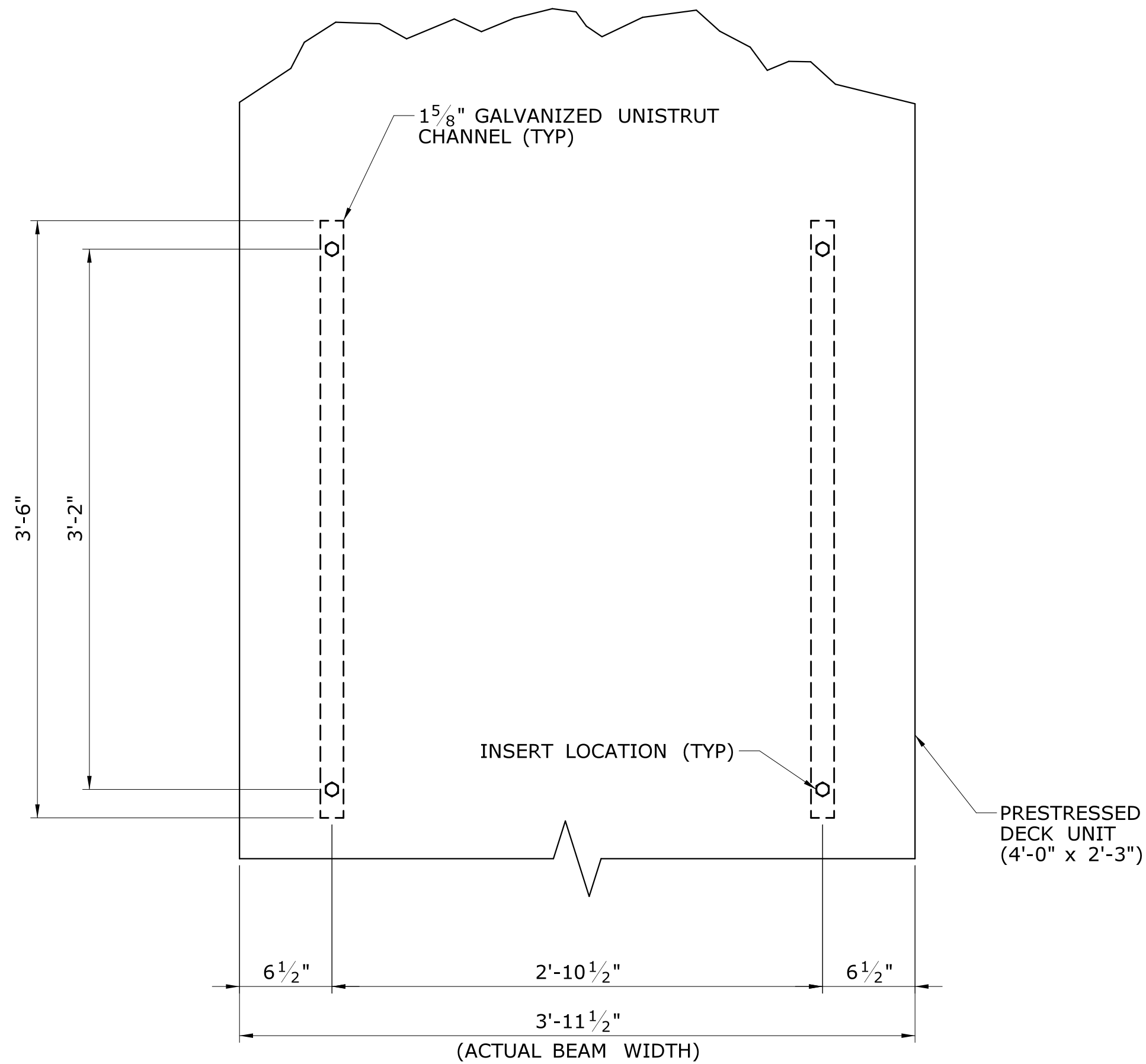
STAGE 12

1. REMOVE THE REMAINING TEMPORARY PROTECTIVE FENCE PANELS. REMOVE BONDING WIRES FROM THE TEMPORARY PROTECTIVE FENCE PANEL POSTS.
2. REMOVE THE REMAINING TEMPORARY PRECAST CONCRETE BARRIER CURBS.

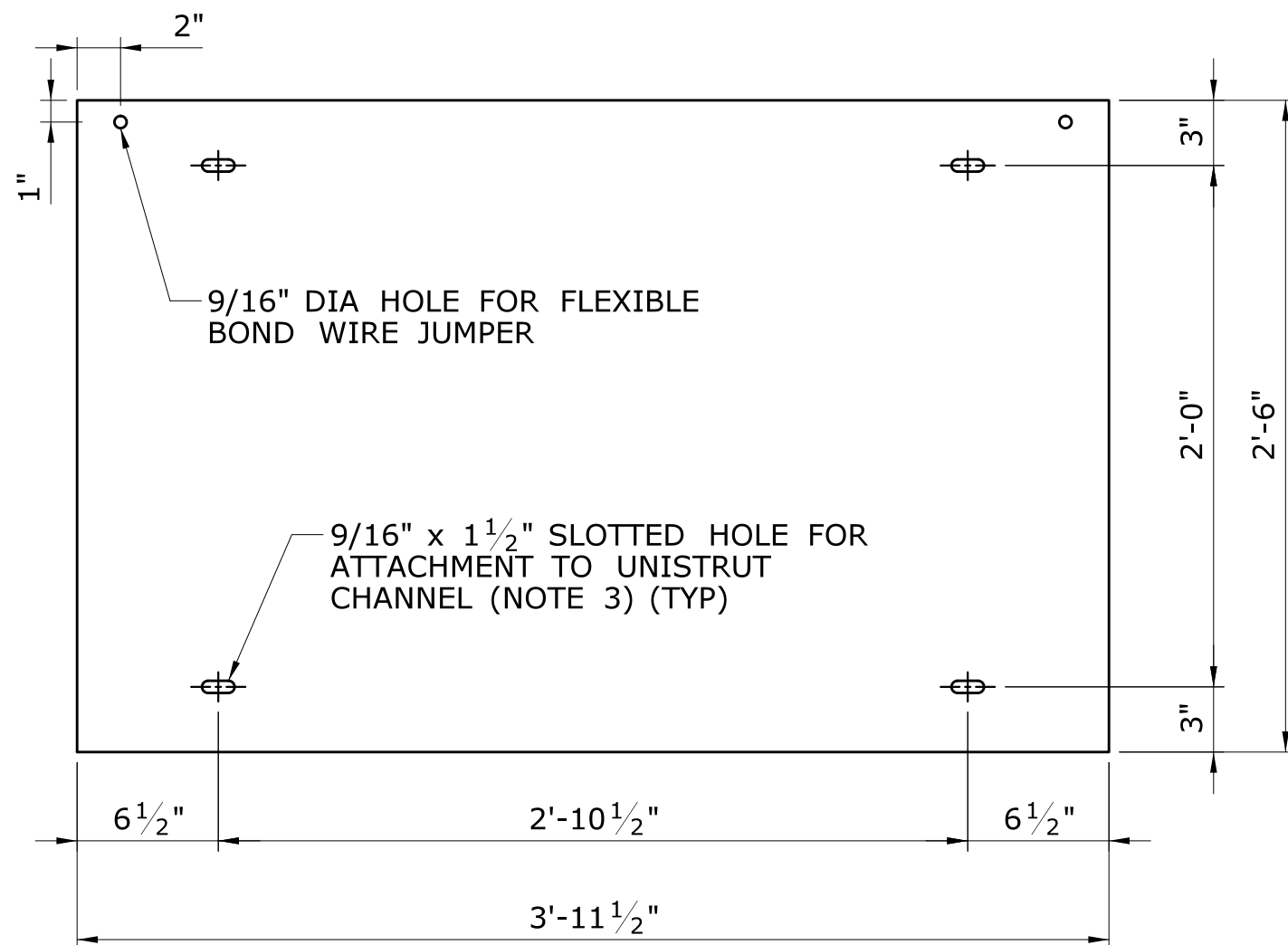


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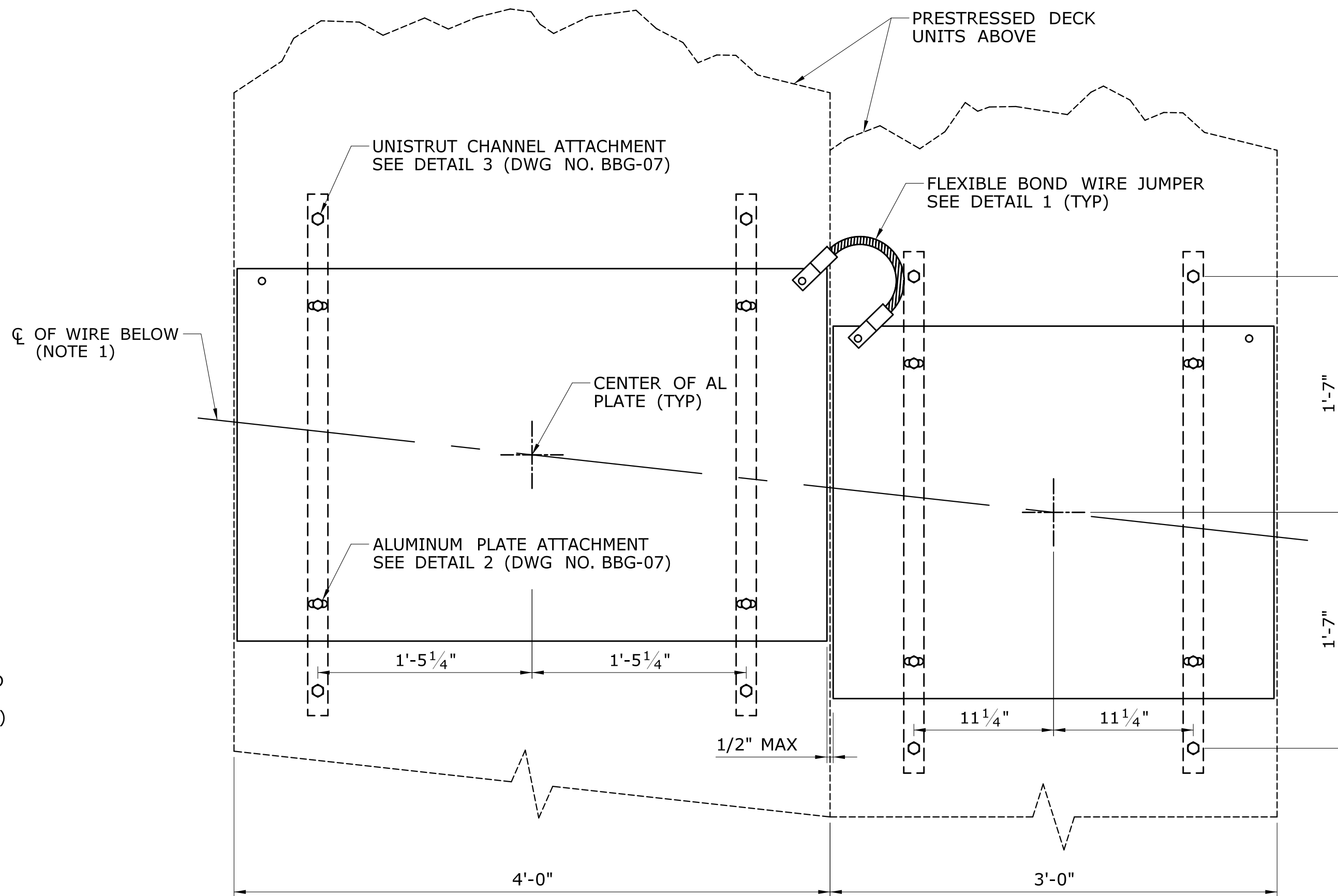
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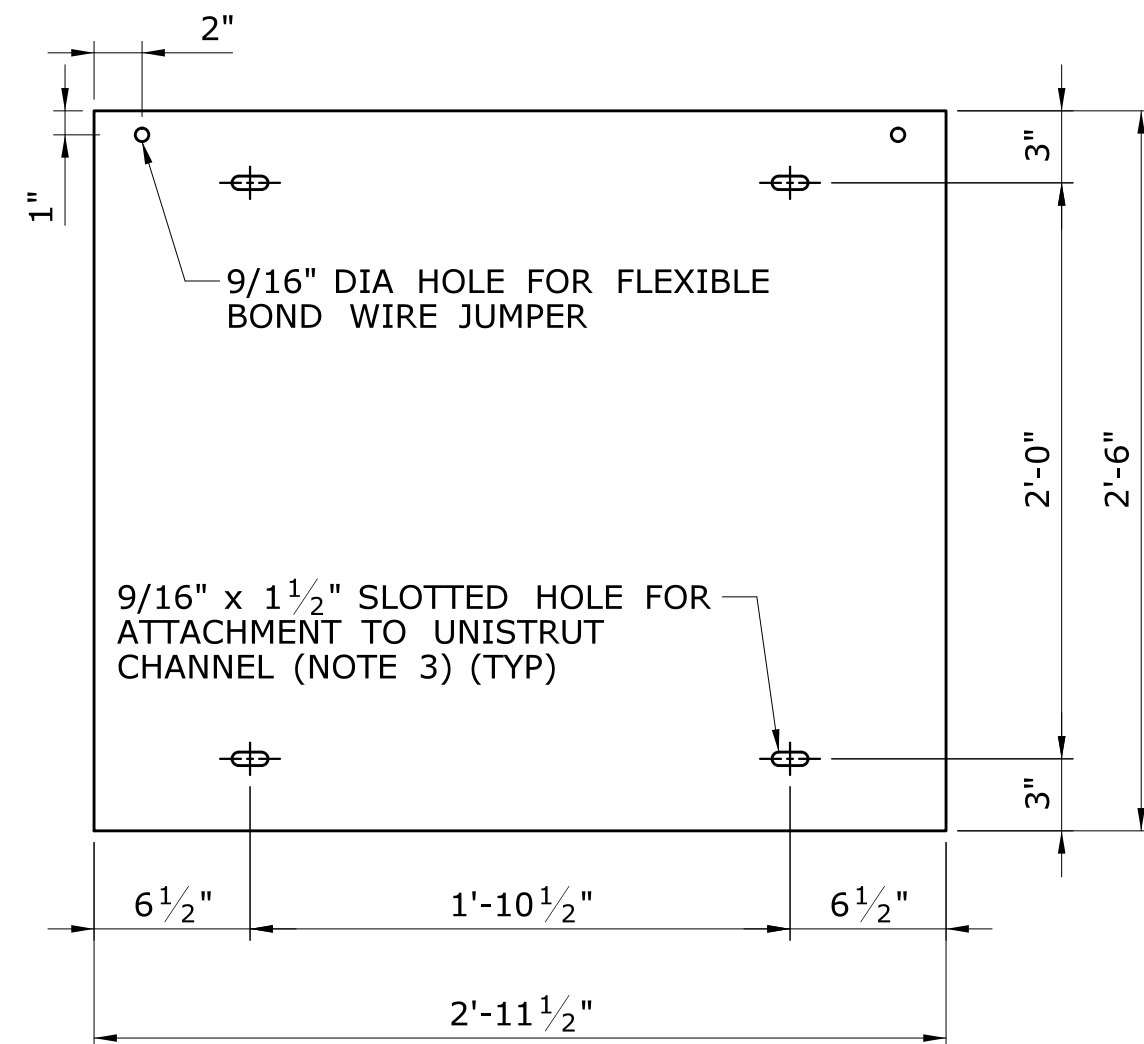
CAST-IN-PLACE INSERT LOCATIONS FOR 4'-0" WIDE DECK UNIT
(SIMILAR FOR 3'-0" DECK UNIT)
SCALE: N.T.S.



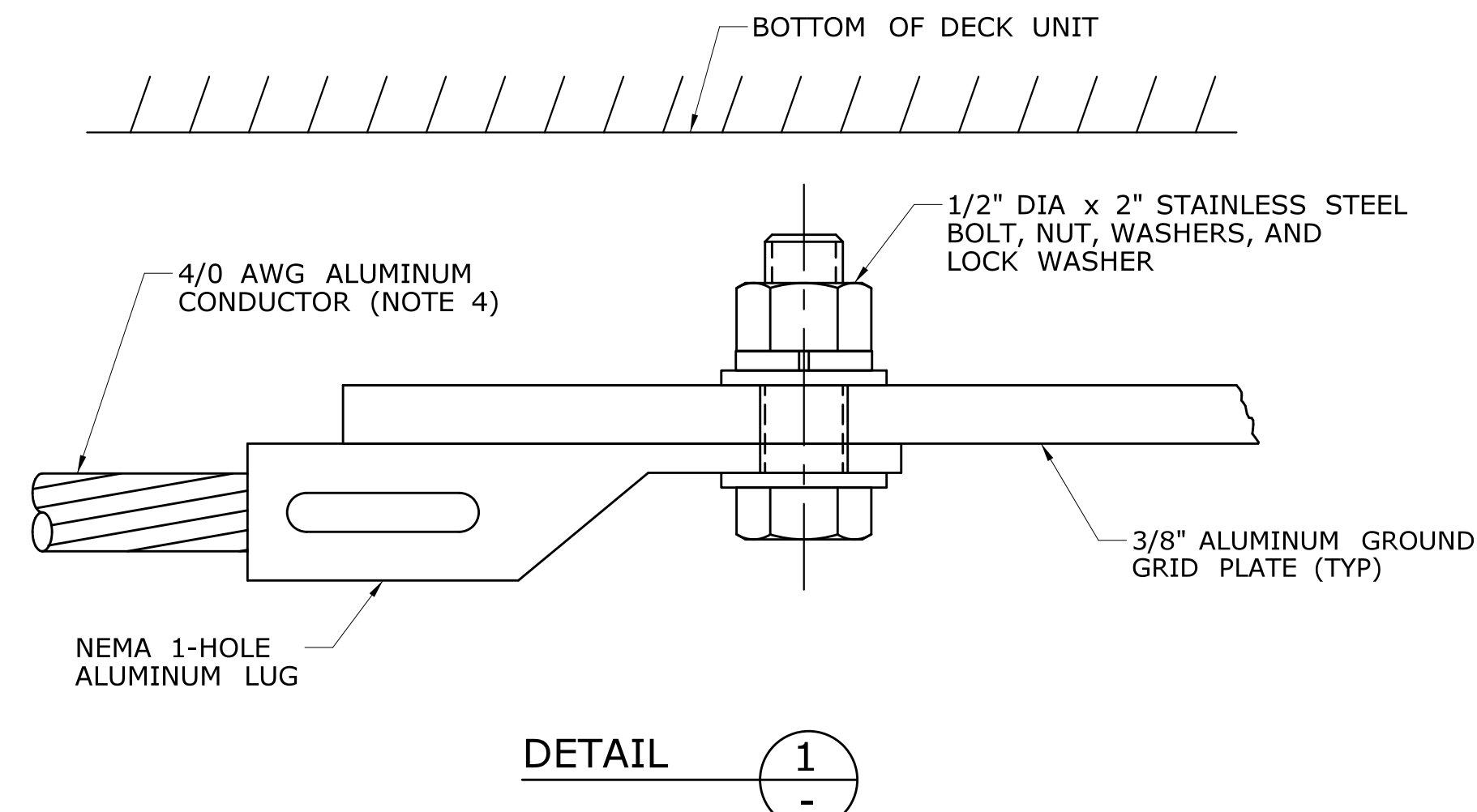
ALUMINUM PLATE FOR 4'-0" WIDE DECK UNIT
SCALE: N.T.S.



TYPICAL ALUMINUM PLATE LAYOUT
SCALE: N.T.S.



ALUMINUM PLATE FOR 3'-0" WIDE DECK UNIT
SCALE: N.T.S.




CONNECTION OF FLEXIBLE BOND WIRE JUMPER TO ALUMINUM PLATES
SCALE: N.T.S.

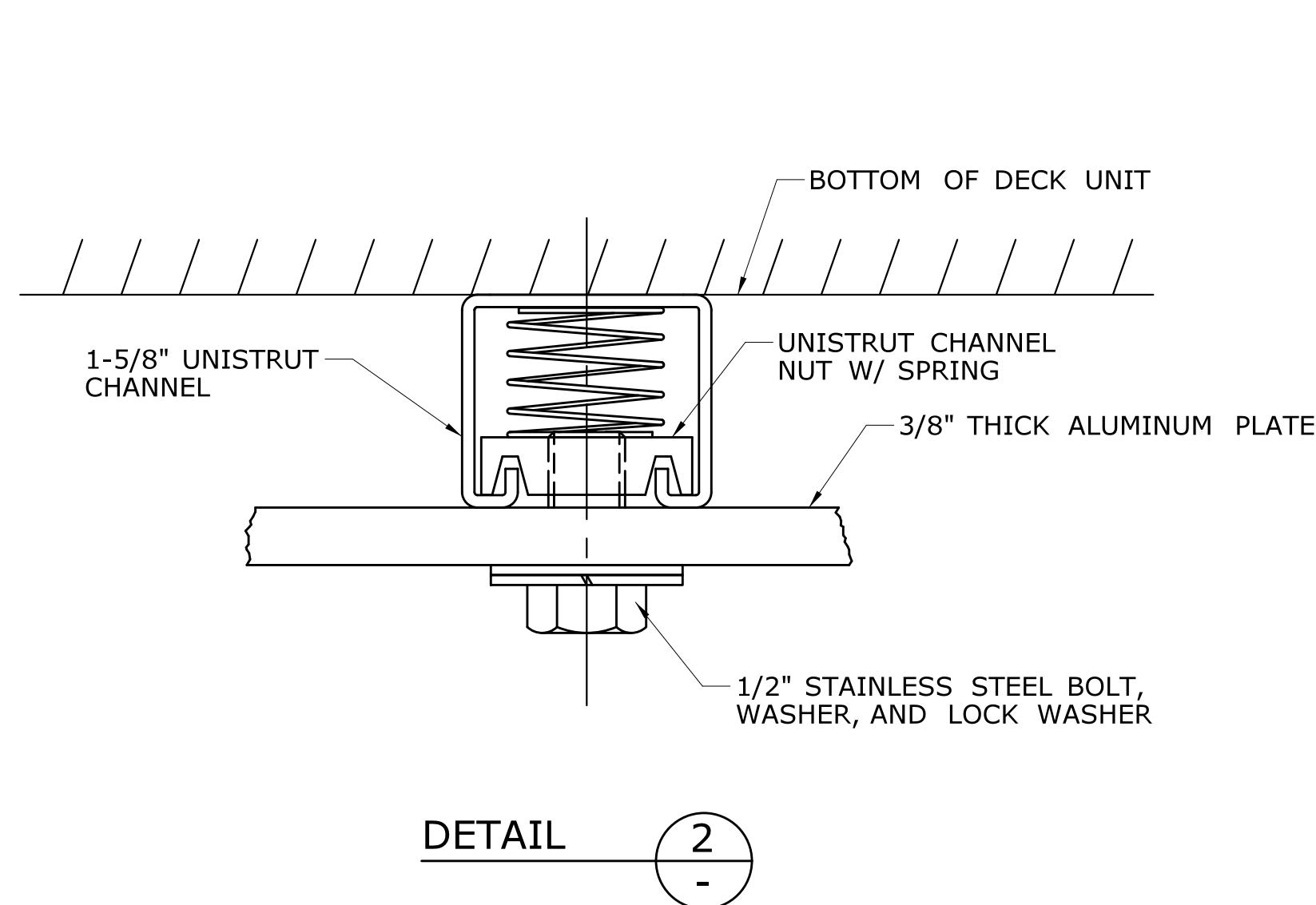
NOTES:

1. CONTRACTOR SHALL SURVEY EXISTING WIRES TO CONFIRM THEIR ASSUMED LOCATIONS PRIOR TO SETTING INSERT LOCATIONS.
2. SEE FRAMING PLANS IN STRUCTURAL SUBSET FOR ASSUMED WIRE LOCATIONS.
3. CONFIRM INSERT LOCATIONS IN DECK UNITS PRIOR TO FABRICATION OF ALUMINUM PLATES.
4. THE TOTAL LENGTH OF THE FLEXIBLE BOND WIRE JUMPERS SHALL BE 1'-6" (FROM END OF LUG TO END OF LUG) AND SHALL HAVE A MINIMUM BENDING RAIDUS OF 3".

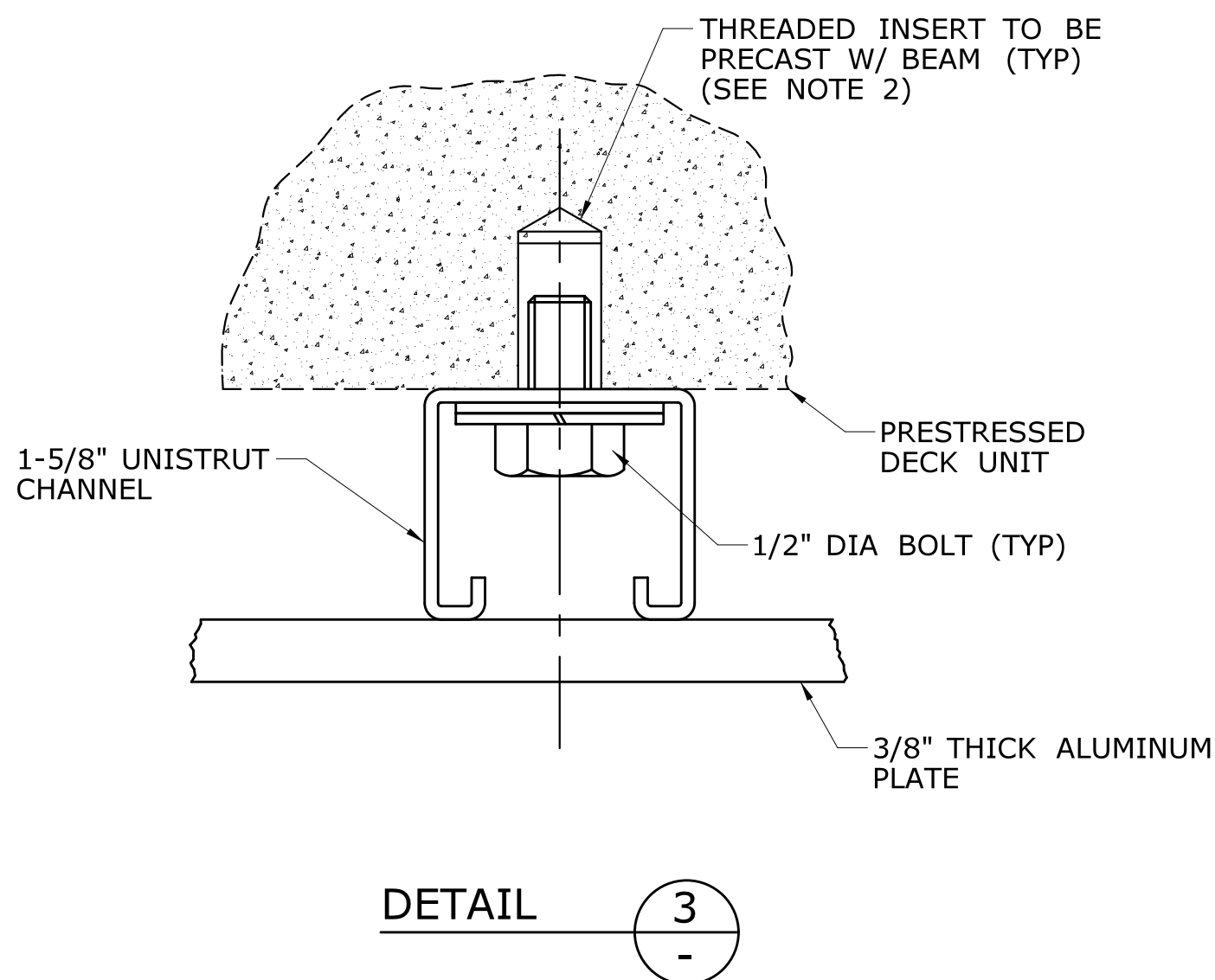
DETAIL 1

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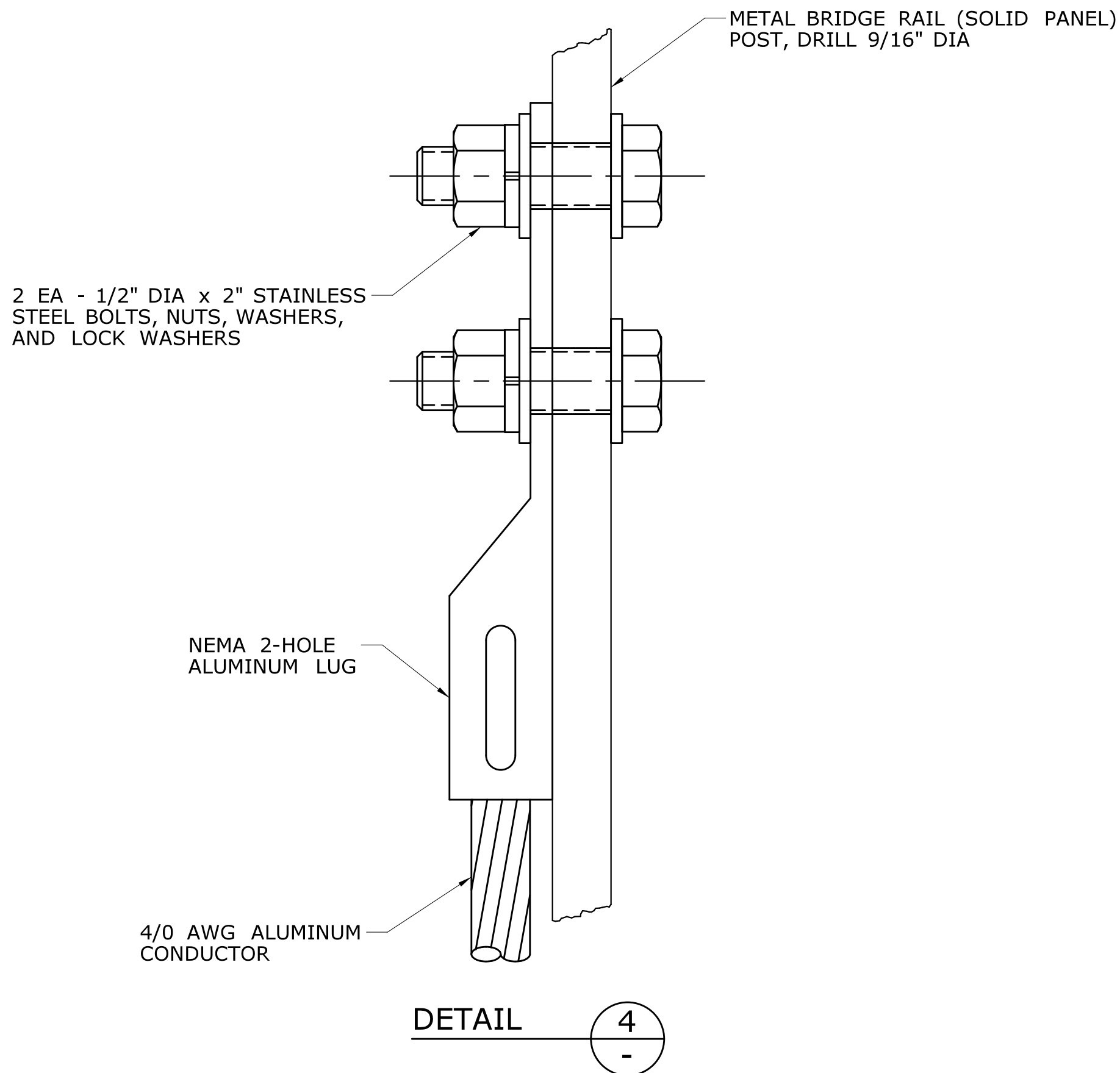
	THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.	DESIGNER/DRAFTER: AJM CHECKED BY: WJS/WWF SCALE AS NOTED	 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION Filename: ...\\058-332-G&B-assembly-details-Sheet-1.dgn	SIGNATURE/BLOCK: GANNETT FLEMING APPROVED BY:	PROJECT TITLE: RECONSTRUCTION OF ROUTE 349 NB AND SB OVER AMTRAK RAILROAD	TOWN: GROTON DRAWING TITLE: GROUNDING & BONDING ASSEMBLY DETAILS SHEET 1 OF 2	PROJECT NO. 058-332 DRAWING NO. BBG-06 SHEET NO.
REV. DATE REVISION DESCRIPTION SHEET NO.	Plotted Date: 3/3/2016						



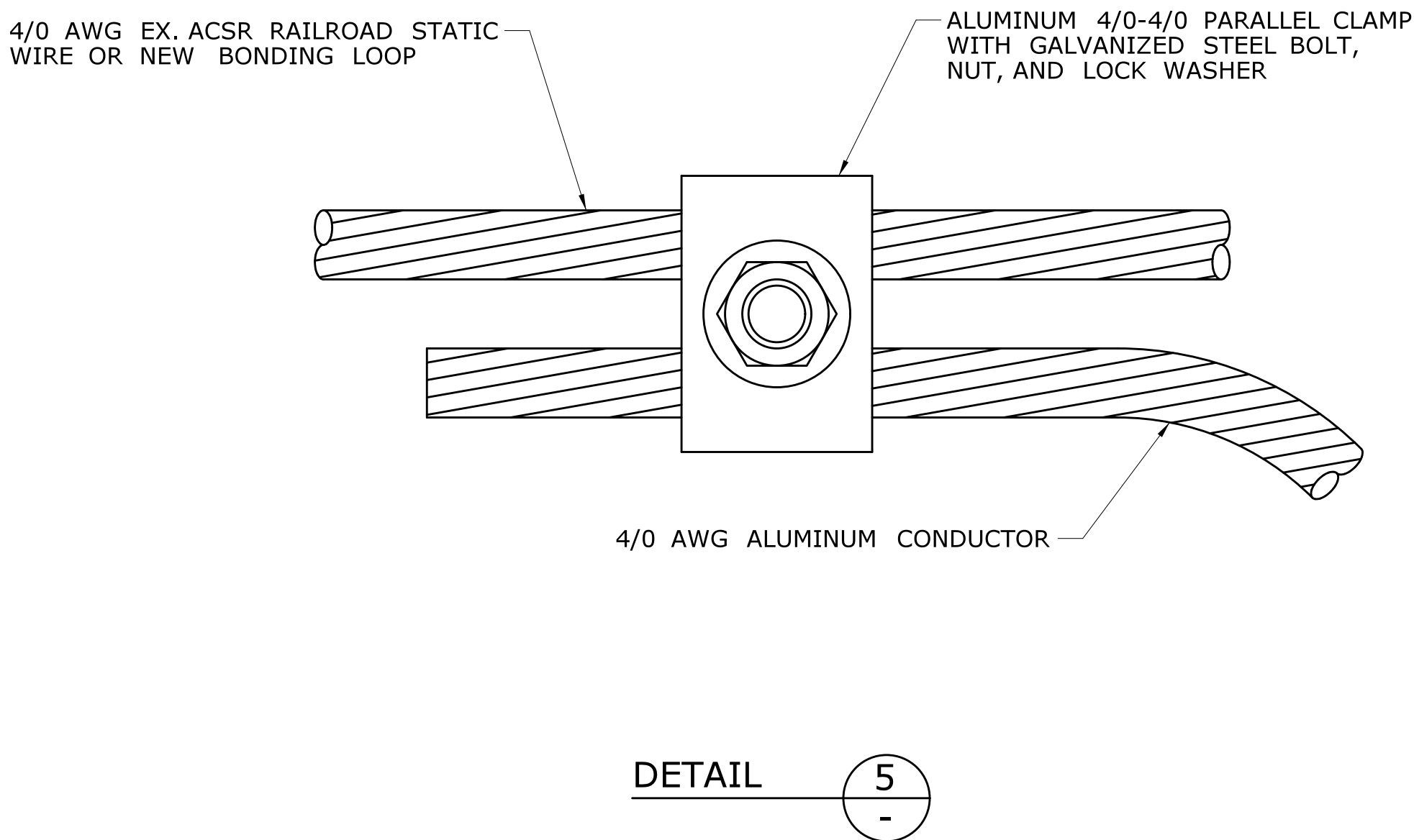
ATTACHMENT OF ALUMINUM PLATES TO UNISTRUT CHANNEL
SCALE: N.T.S.



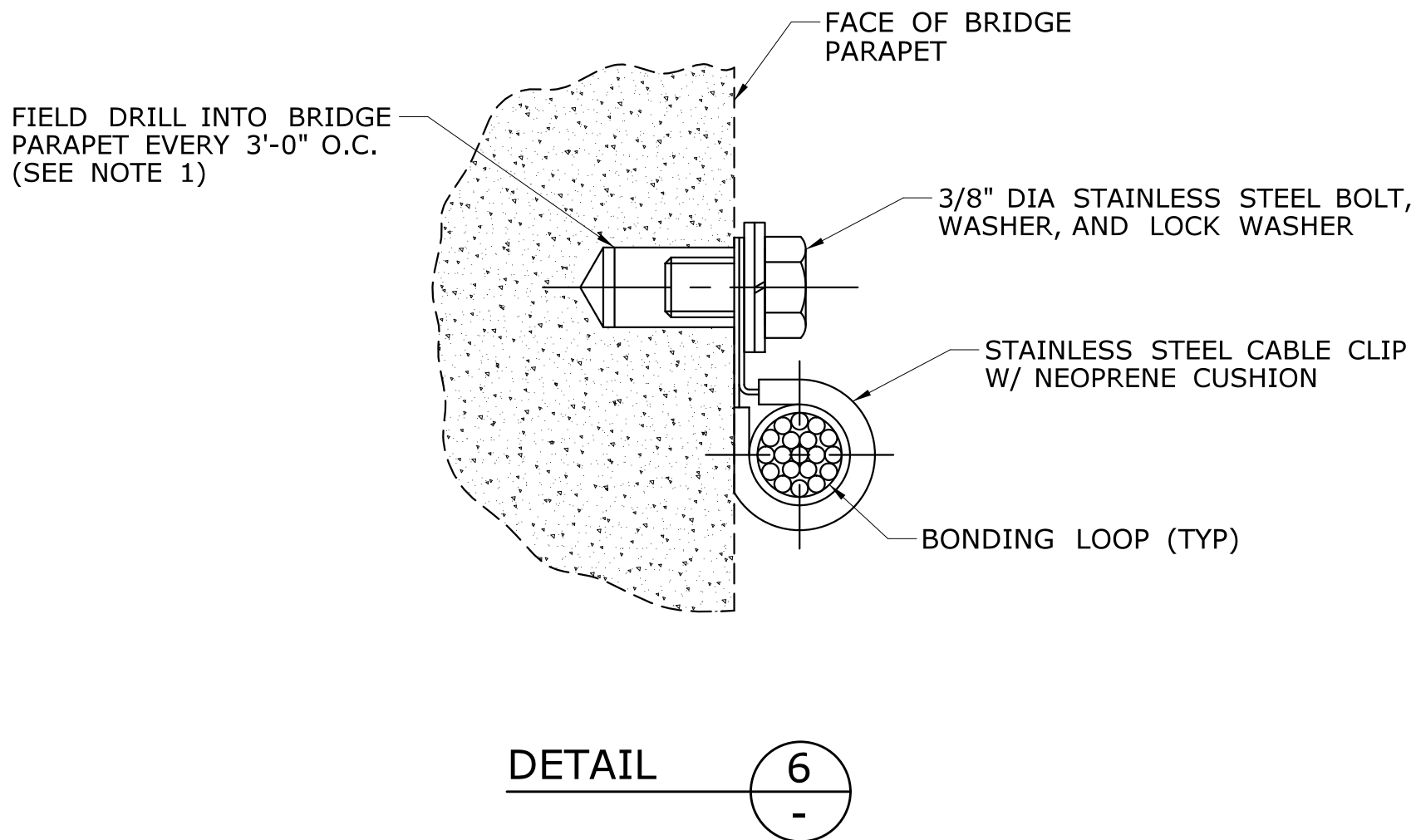
ATTACHMENT OF UNISTRUT CHANNEL TO BRIDGE BEAMS
SCALE: N.T.S.



CONNECTION OF BOND WIRE TO
POST OF METAL BRIDGE RAIL (SOLID PANEL)
SCALE: N.T.S.




PARALLEL CLAMP FOR ATTACHMENT OF BOND WIRES
TO RAILROAD STATIC WIRE AND BONDING LOOP
SCALE: N.T.S.



ATTACHMENT OF BONDING LOOP TO BRIDGE PARAPET
SCALE: N.T.S.

- NOTES:
1. CONTRACTOR TO PROVIDE A MECHANICAL OR ADHESIVE ANCHORING SYSTEM WITH A MINIMUM NOMINAL EMBEDMENT DEPTH OF 2⁵/₁₆ inch.
 2. THE THREADED INSERTS PRECAST WITH THE DECK UNITS SHALL BE INCIDENTAL TO THE PRESTRESSED DECK UNITS. ALL OTHER WORK SHOWN ON THIS PLAN SHEET SHALL BE INCIDENTAL TO THE GROUNDING AND BONDING SYSTEM.

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				THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.	DESIGNER/DRAFTER: AJM CHECKED BY: WJS/WWF SCALE AS NOTED	 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION Filename: ...\\058-332_G&B_assembly_details_Sheet_2.dgn	SIGNATURE/ BLOCK: GANNETT FLEMING APPROVED BY:	PROJECT TITLE: RECONSTRUCTION OF ROUTE 349 NB AND SB OVER AMTRAK RAILROAD	TOWN: GROTON	PROJECT NO. 058-332
								DRAWING TITLE: GROUNDING & BONDING ASSEMBLY DETAILS SHEET 2 OF 2	DRAWING NO. BBG-07	
									SHEET NO.	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 3/3/2016						